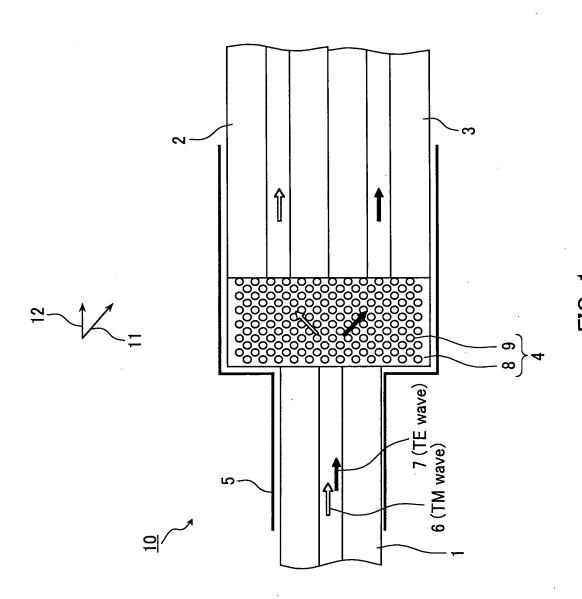
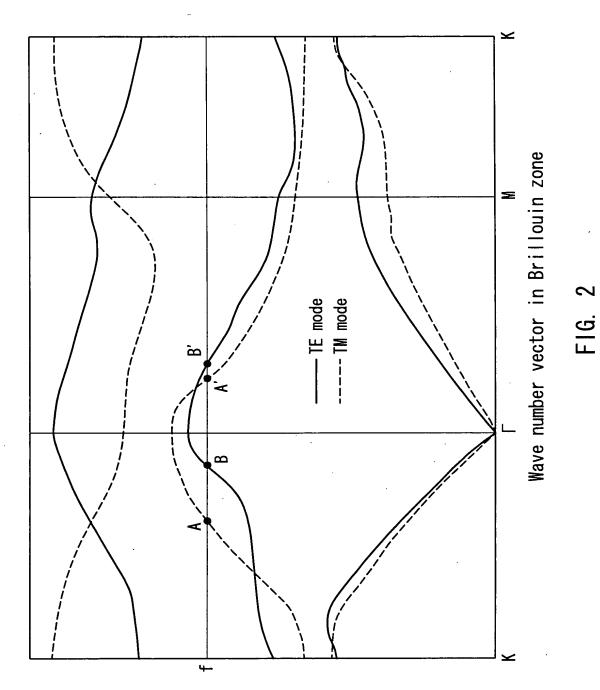
Inventor: Hidenobu HAMADA
Docket No.: 10873.878US01
le: OPTICAL DEVICE
orney Name: Douglas P. Mueller
one No.: 612.371.5237
Sheet 1 of 22



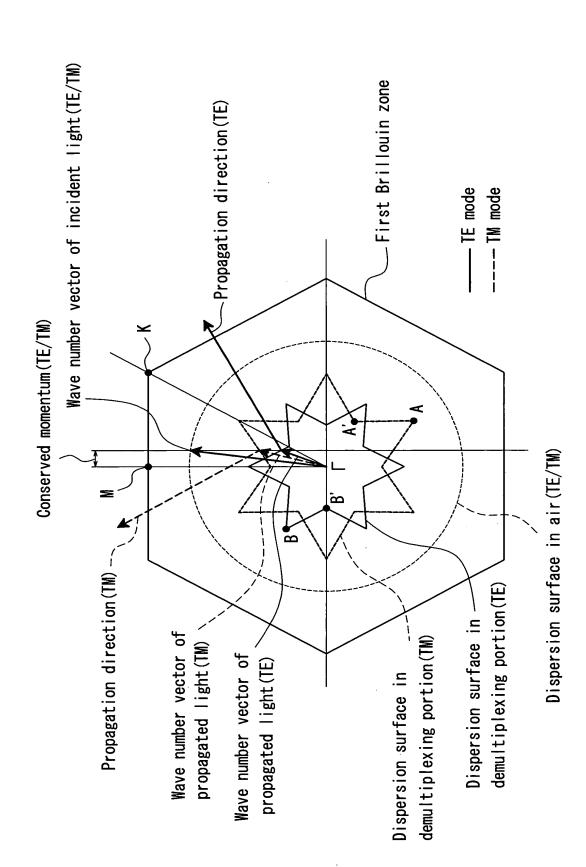
Inventor: Hidenobu HAMADA Docket No.: 10873.878US01 Title: OPTICAL DEVICE Attorney Name: Douglas P. Mueller Phone No.: 612.371.5237

Sheet 2 of 22



Normalized frequency

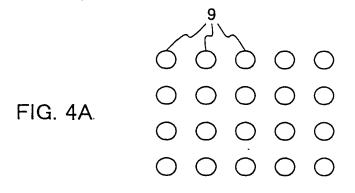
Inventor: Hidenobu HAMADA Docket No.: 10873.878US01 Title: OPTICAL DEVICE Attorney Name: Douglas P. Mueller Phone No.: 612.371.5237 Sheet 3 of 22

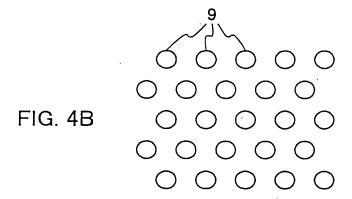


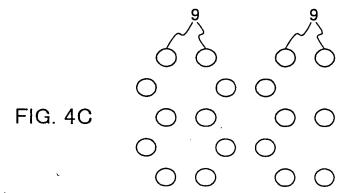
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Inventor: Hidenobu HAMADA Docket No.: 10873.878US01 Title: OPTICAL DEVICE Attorney Name: Douglas P. Mueller Phone No.: 612.371.5237

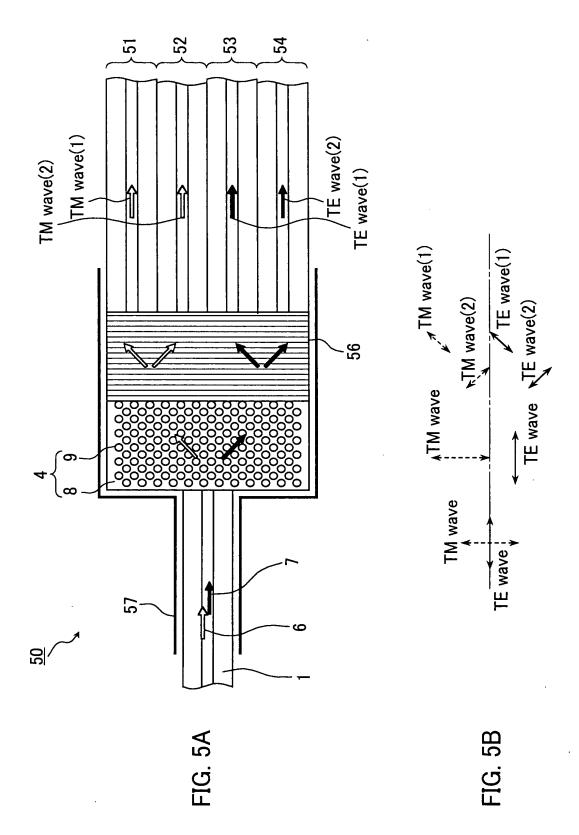
Sheet 4 of 22



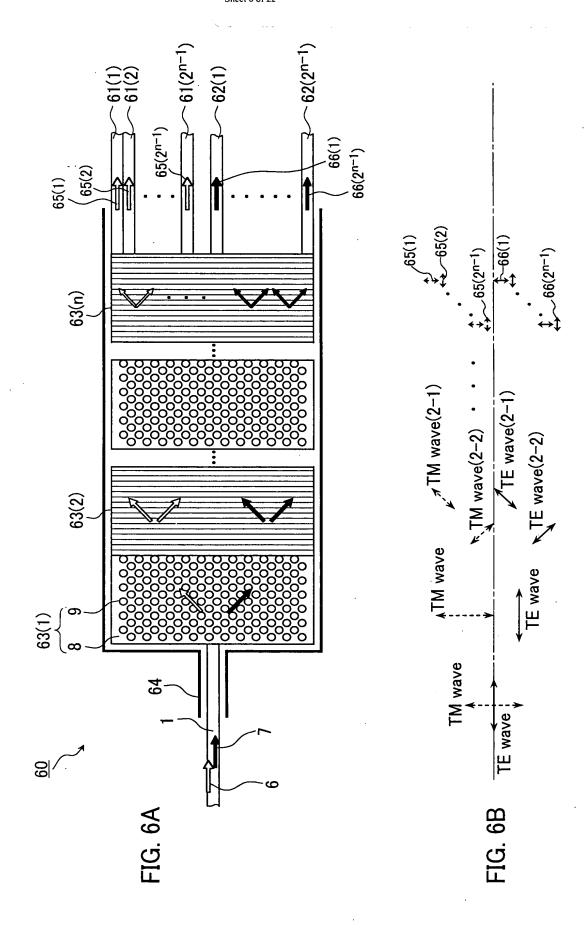




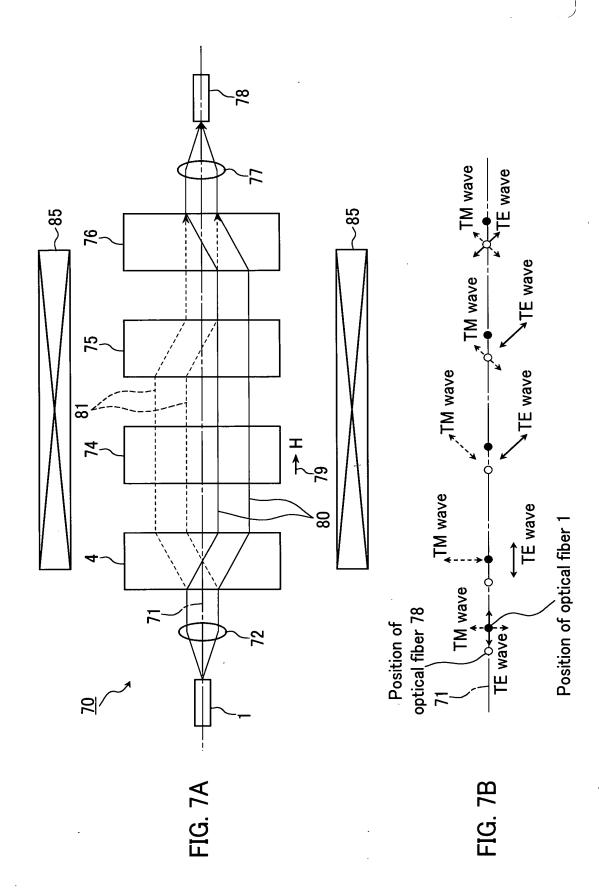
Inventor: Hidenobu HAMADA Docket No.: 10873.878US01 Title: OPTICAL DEVICE Attorney Name: Douglas P. Mueller Phone No.: 612.371.5237 Sheet 5 of 22



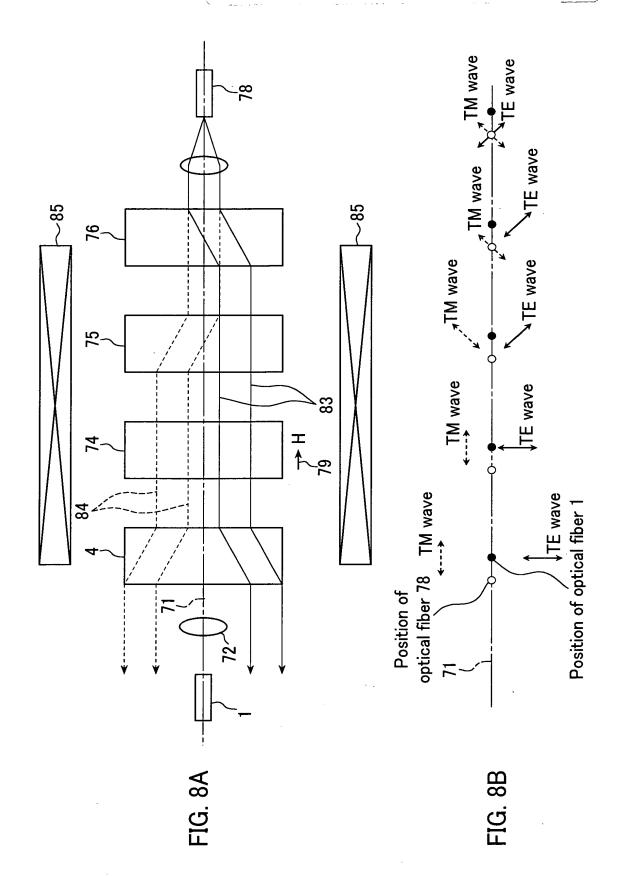
Inventor: Hidenobu HAMADA Docket No.: 10873.878US01 Title: OPTICAL DEVICE Attorney Name: Douglas P. Mueller Phone No.: 612.371.5237 Sheet 6 of 22



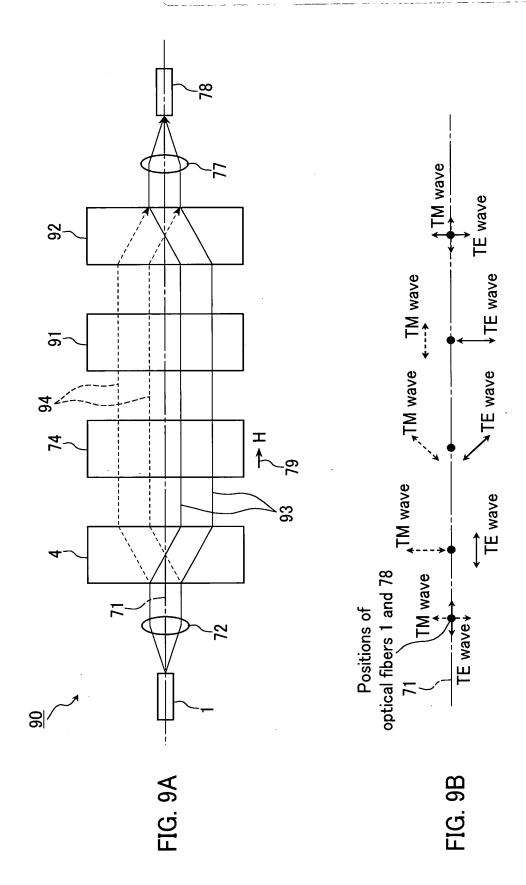
Inventor: Hidenobu HAMADA Docket No.: 10873.878US01 Title: OPTICAL DEVICE Attorney Name: Douglas P. Mueller Phone No.: 612.371.5237 Sheet 7 of 22



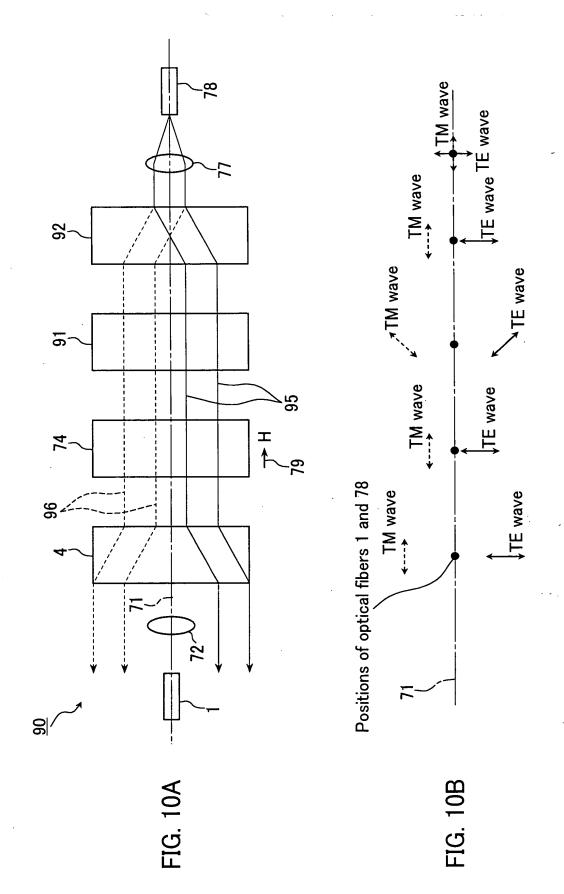
Inventor: Hidenobu HAMADA Docket No.: 10873.878US01 Title: OPTICAL DEVICE Attorney Name: Douglas P. Mueller Phone No.: 612.371.5237 Sheet 8 of 22



Inventor: Hidenobu HAMADA Docket No.: 10873.878US01 Title: OPTICAL DEVICE Attorney Name: Douglas P. Mueller Phone No.: 612.371.5237 Sheet 9 of 22

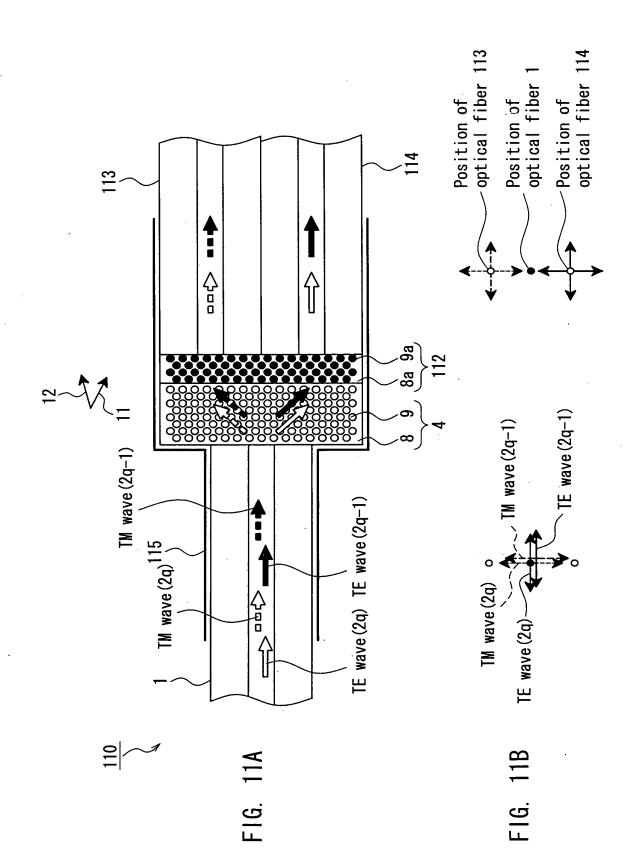


Inventor: Hidenobu HAMADA
Docket No.: 10873.878US01
Title: OPTICAL DEVICE
Attorney Name: Douglas P. Mueller
Phone No.: 612.371.5237
Sheet 10 of 22

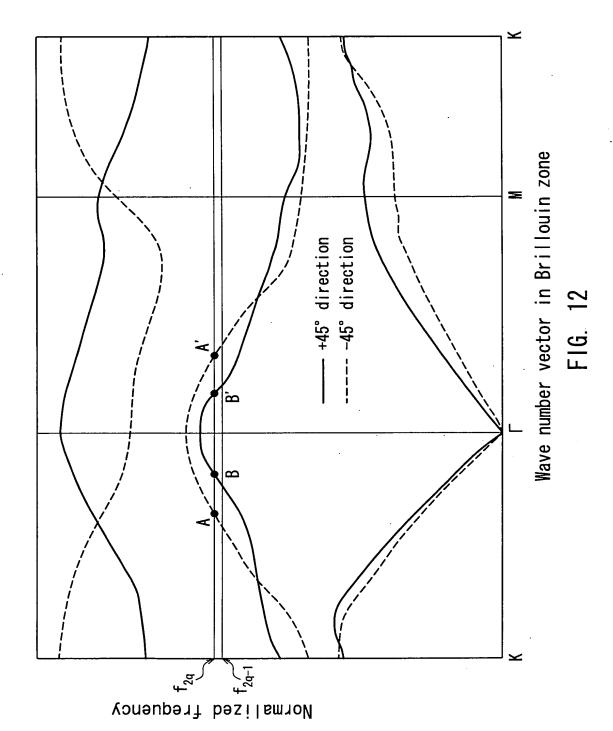


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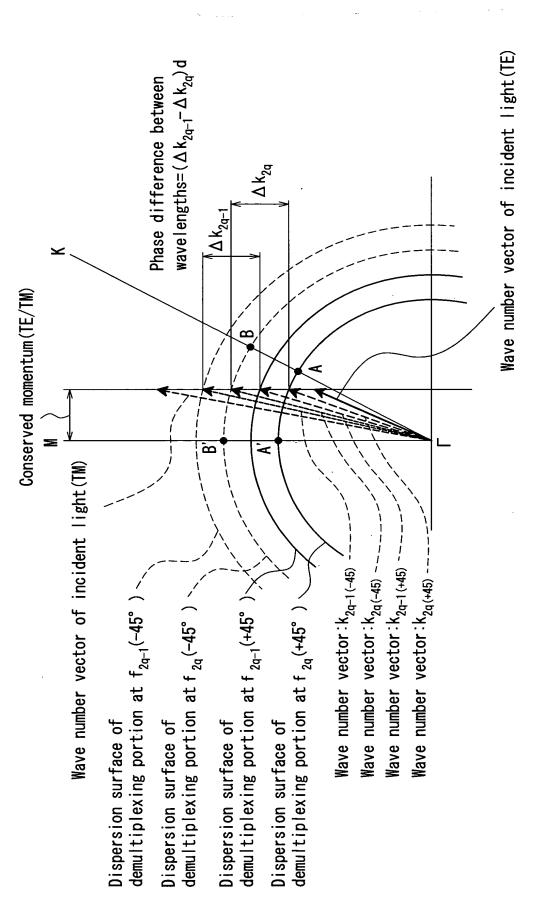
Sheet 11 of 22



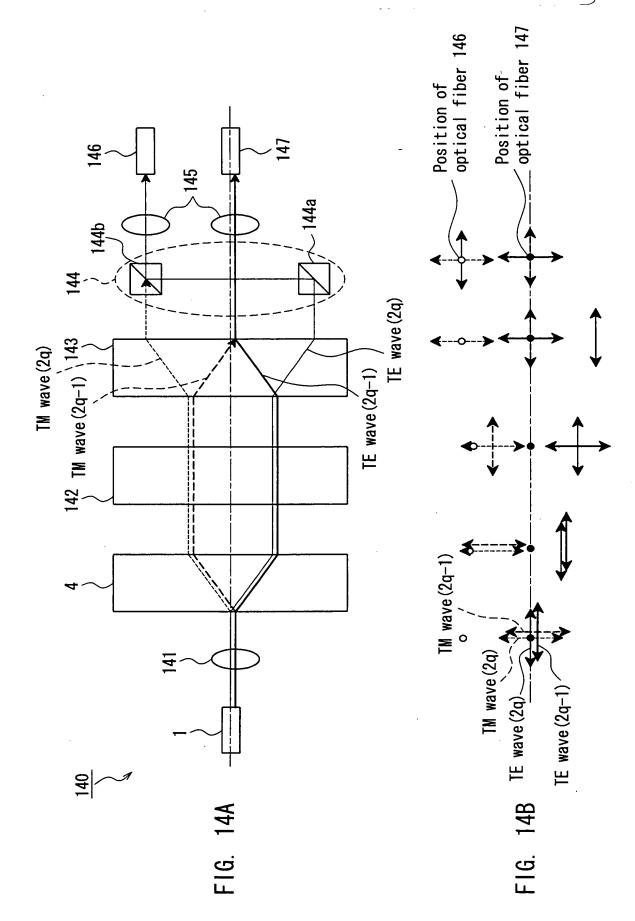
Inventor: Hidenobu HAMADA Docket No.: 10873.878US01 Title: OPTICAL DEVICE Attorney Name: Douglas P. Mueller Phone No.: 612.371.5237 Sheet 12 of 22



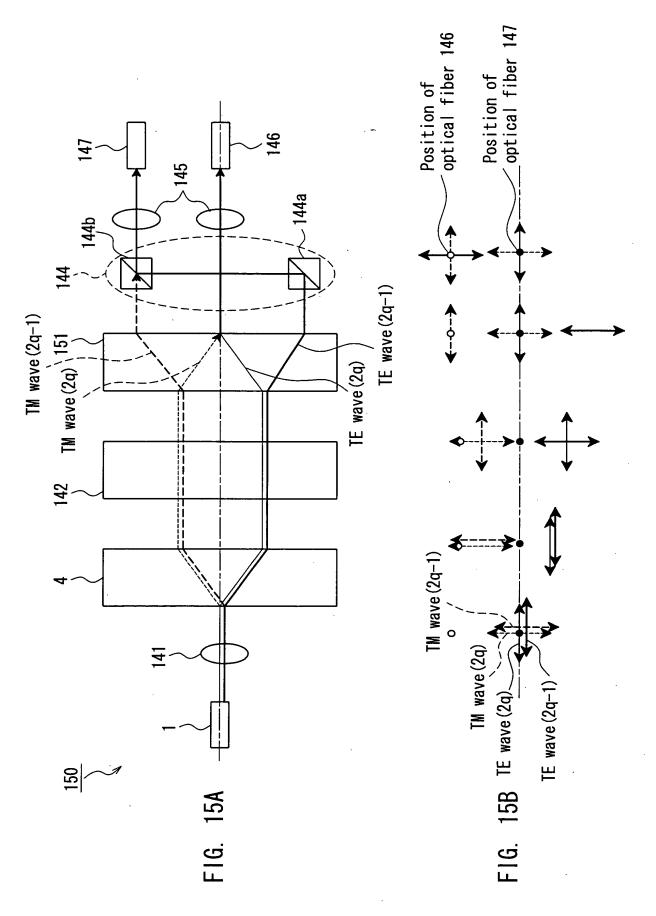
Inventor: Hidenobu HAMADA
Docket No.: 10873.878US01
Title: OPTICAL DEVICE
Attorney Name: Douglas P. Mueller
Phone No.: 612.371.5237
Sheet 13 of 22



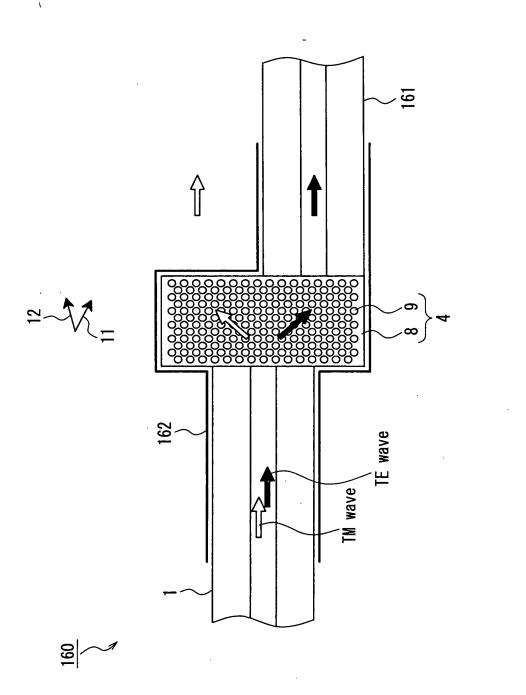
Inventor: Hidenobu HAMADA Docket No.: 10873.878US01 Title: OPTICAL DEVICE Attorney Name: Douglas P. Mueller Phone No.: 612.371.5237 Sheet 14 of 22



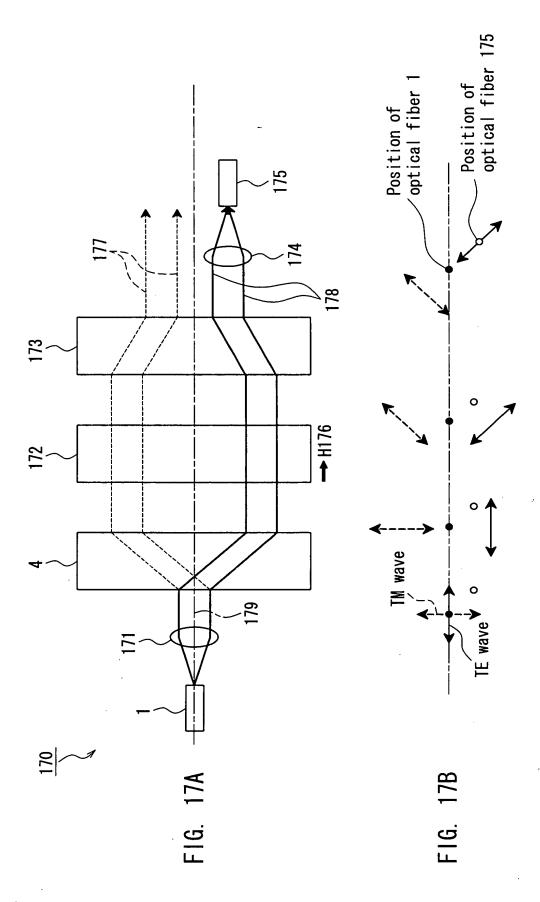
Inventor: Hidenobu HAMADA Docket No.: 10873.878US01 Title: OPTICAL DEVICE Attorney Name: Douglas P. Mueller Phone No.: 612.371.5237 Sheet 15 of 22



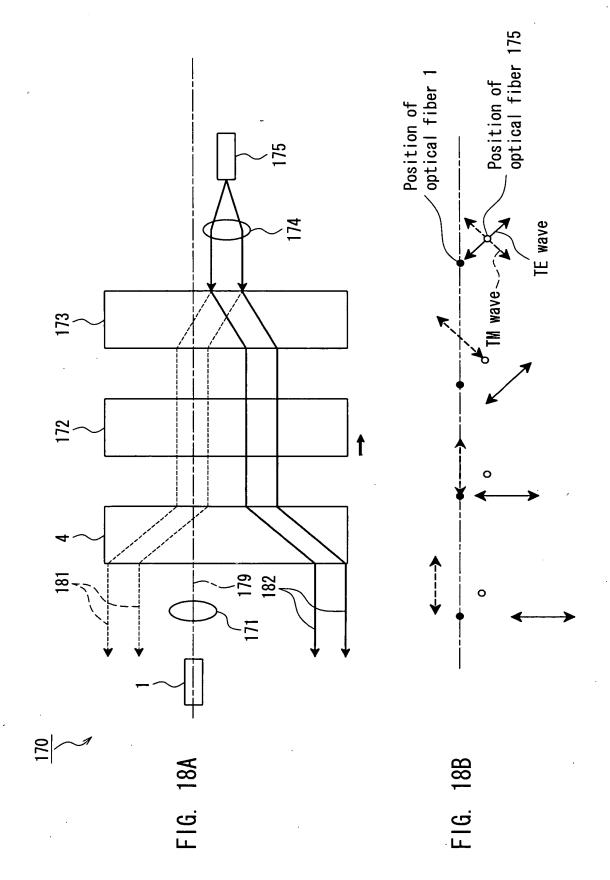
Inventor: Hidenobu HAMADA Docket No.: 10873.878US01 Title: OPTICAL DEVICE Attorney Name: Douglas P. Mueller Phone No.: 612.371.5237 Sheet 16 of 22



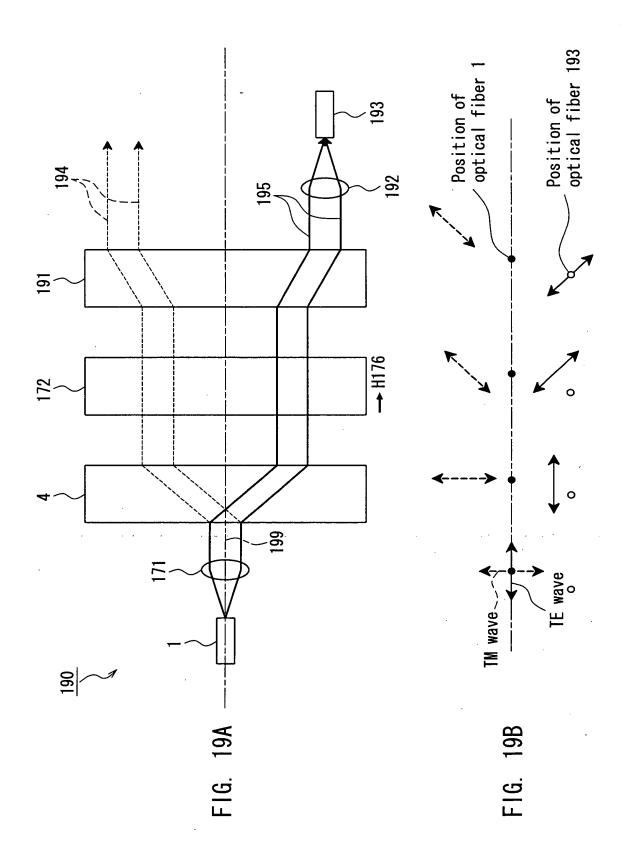
Inventor: Hidenobu HAMADA Docket No.: 10873.878US01 Title: OPTICAL DEVICE Attorney Name: Douglas P. Mueller Phone No.: 612.371.5237 Sheet 17 of 22



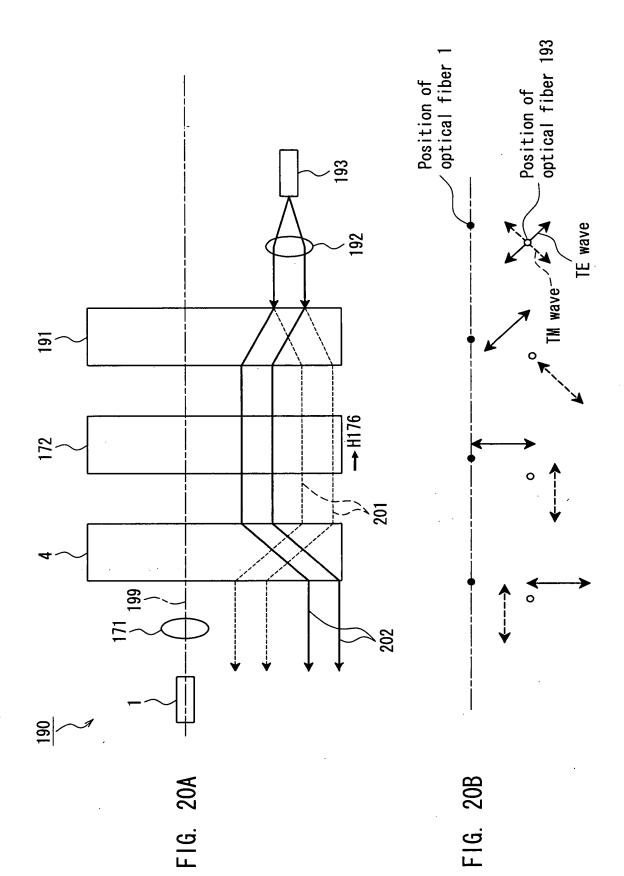
Inventor: Hidenobu HAMADA Docket No.: 10873.878US01 Title: OPTICAL DEVICE Attorney Name: Douglas P. Mueller Phone No.: 612.371.5237 Sheet 18 of 22



Inventor: Hidenobu HAMADA Docket No.: 10873.878US01 Title: OPTICAL DEVICE Attorney Name: Douglas P. Mueller Phone No.: 612.371.5237 Sheet 19 of 22



Inventor: Hidenobu HAMADA Docket No.: 10873.878US01 Title: OPTICAL DEVICE Attorney Name: Douglas P. Mueller Phone No.: 612.371.5237 Sheet 20 of 22





Inventor: Hidenobu HAMADA
Docket No.: 10873.878US01
Title: OPTICAL DEVICE
Attorney Name: Douglas P. Mueller
Phone No.: 612.371.5237
Sheet 21 of 22

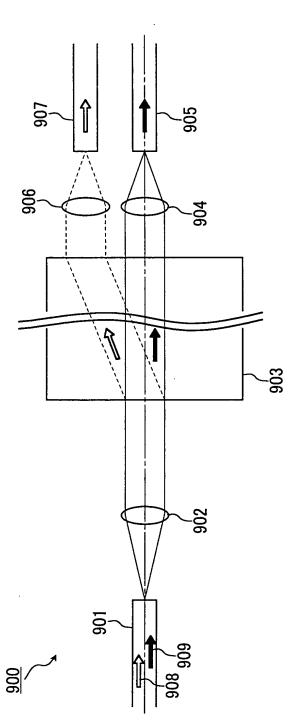


FIG. 21 (PRIOR ART)

Attorney Name: Douglas P. Mueller Phone No.: 612.371.5237 Sheet 22 of 22 -Wave number vector of incident light(TE/TM) Wave number vector of propagated light(TM) -Propagation direction(TE) - Propagation direction(TM) - TE mode ---- TM mode k_z(Extraordinary light) ž ky (Ordinary light) Conserved momentum (TE/TM) Wave number vector of propagated light(TM) extraordinary light birefringence(TM) ordinary light birefringence(TE) -Dispersion surface in air(TE/TM) Dispersion surface of Dispersion surface of

Inventor: Hidenobu HAMADA Docket No.: 10873.878US01 Title: OPTICAL DEVICE

FIG. 22 (PRIOR ART)